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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|---------------------------|----------------------------|------------------|
| 10/534,239 | 11/08/2005 | Peter Edward James Abbott | JMYS-126US | 2733 |
| 23122 | 7590 | 04/05/2007 | | |
| RATNERPRESTIA P O BOX 980 VALLEY FORGE, PA 19482-0980 | | | EXAMINER PARSA, JAFAR F | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1621 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS | 04/05/2007 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/534,239

Applicant(s)

ABBOTT ET AL.

Examiner

Jafar Parsa

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-69 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>5/6/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abbott et al (WO 00/09441) in view of Banquy (USPN 4,999,133).

Applicants' claimed invention is directed to a process for production of hydrocarbons including a) reforming a divided hydrocarbon feedstock stream, mixing the first stream with steam, passing the mixture over a catalyst disposed in heated heat exchange reformer tubes to form a primary reformed gas, forming a secondary reformer feed stream including the primary reformed gas and the second hydrocarbon stream, partially combusting the secondary reformer feed stream and bringing the partially combusted gas towards equilibrium over a secondary catalyst, and producing a partially cooled reformed gas, b) further cooling the partially cooled reformed gas below the dew

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point of steam therein to condense water and separating condensed water to give a de-watered synthesis gas, c) synthesizing hydrocarbons from the de-watered synthesis gas by the Fischer-Tropsch reaction and separating some of the synthesized hydrocarbons into a tail gas, and d) incorporating part of the tail gas into the secondary reformer feed stream before partial combustion thereof.

Abbott teaches a process for the Production of synthesis gas for use for synthesizing carbon-containing compounds comprising the steps of:

a) subjecting a gaseous mixture containing at least one hydrocarbon and 0.6 to 2 moles of steam per gram atom of hydrocarbon carbon in said mixture to catalytic primary reforming at an elevated temperature in a heat exchange reformer by passing said mixture through tubes containing a steam reforming catalyst (nickel) heated by a hot gas stream flowing past the exterior of said tubes, thereby forming a primary reformed gas stream; b) without the addition of further hydrocarbon, subjecting the primary reformed gas stream to secondary reforming wherein it is subjected to partial combustion with a gas containing free oxygen to form a hot partially combusted gas stream which is then passed through a bed of a secondary reforming catalyst, thereby forming a secondary reformed gas stream; c) passing said secondary reformed gas stream past the exterior of the tubes of the heat exchange reformer as said hot gas stream, thereby heating the gas inside said tubes and cooling said secondary reformed gas stream; d) further cooling said secondary reformed gas stream, condensing steam therefrom, and separating out the condensed water to give a de-watered secondary reformed gas stream, the reforming conditions being selected to give a de-watered

secondary reformed gas stream having a carbon dioxide content below 20% by volume;
e) recovering carbon dioxide from said de-watered secondary reformed gas stream, before or after use of the latter for synthesis of the carbon-containing compounds. See page 2, line 25 through page 3, line 9.

Abbott teaches that the recycled carbon dioxide is taken from unreacted gas (tail gas) often there is no need for separation of the carbon dioxide from unreacted gas thus some or all of the unreacted gas from the Fischer-Tropsch synthesis is recycled to form part of the reformer feed. See page 7, lines 16-22.

Abbott discloses that some of the hydrogen may be separated from the de-watered secondary reformed gas is desired in order to modify the hydrogen to carbon monoxide ratio. See page 7, lines 6-8.

The difference between Abbott and the claimed invention is that the instant claims require dividing the feedstock into a first and second stream for reforming the hydrocarbon feedstock to synthesis gas. However, Banquy teaches that dividing the feedstock into two fractions, the first fraction representing about 30 to 66.7 per cent of the total feedstock, (b) subjecting the first fraction from (a) to a primary steam reforming reaction under a high pressure, by mixing said fraction with steam, and heating the mixture thereof by indirect heat exchange, in the presence of a reforming catalyst, to form a gaseous effluent including hydrogen, (c) preheating the second fraction from (a), by indirect heat exchange and mixing said fraction with the gas effluent from (b), (d) combining effluent gas streams from (b) and (c) to obtain a gas mixture for a partial

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combustion for producing synthesis gas suitable for the production of hydrocarbons.

See columns 5-6, lines 50-15.

It would therefore have been obvious to one of ordinary skill in the art at the time the invention was made to split the feedstock into two fractions as taught by Bnquy, in order to preheat the second fraction with the reformed gas obtained from the first fraction to obtain a feed stream suitable for the partial combustion.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abbott et al (WO 03/016250) in view of Banquy (USPN 4,999,133).

Abbott teaches a process for making synthesis gas for a Fischer-Tropsch process is obtained by primary steam reforming a hydrocarbon feedstock in tubes in a heat-exchange reformer, subjecting the primary reformed gas to secondary reforming and using the hot secondary reformed gas to heat the tubes in the heat exchange reformer. The resultant reformed gas is then cooled, de-watered, and used to form hydrocarbons in the Fischer-Tropsch process. At least a part of the tail gas from the Fischer-Tropsch process is recycled by adding it to the primary reformed gas before secondary reforming. See abstract.

Abbott teaches that the de-watered syngas is then fed via line 42, to an optional hydrogen separation unit to separate part of the hydrogen in the de-watered gas as a hydrogen stream. Abbott further discloses that part of the tail gas from the Fischer-Tropsch synthesis reaction is mixed with the primary reformed gas before is being fed to the secondary reformer. See page 5, lines 20-31.

The difference between Abbott and the claimed invention is that the instant claims require dividing the feedstock into a first and second stream for reforming the hydrocarbon feedstock to synthesis gas. However, Banquy teaches that dividing the feedstock into two fractions, the first fraction representing about 30 to 66.7 per cent of the total feedstock, (b) subjecting the first fraction from (a) to a primary steam reforming reaction under a high pressure, by mixing said fraction with steam, and heating the mixture thereof by indirect heat exchange, in the presence of a reforming catalyst, to form a gaseous effluent including hydrogen, (c) preheating the second fraction from (a), by indirect heat exchange and mixing said fraction with the gas effluent from (b), (d) combining effluent gas streams from (b) and (c) to obtain a gas mixture for a partial combustion for producing synthesis gas suitable for the production of hydrocarbons. See columns 5-6, lines 50-15.

It would therefore have been obvious to one of ordinary skill in the art at the time the invention was made to split the feedstock into two fractions as taught by Banquy, in order to preheat the second fraction with the reformed gas obtained from the first fraction to obtain a feed stream suitable for the partial combustion.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jafar Parsa whose telephone number is (571)272-0643. The examiner can normally be reached on 8 a.m.-4:30 p.m. (M-F).

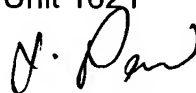
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thurman Page can be reached on 571-272-0602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JP

March 31, 2007

Jafar Parsa
Primary Examiner
Art Unit 1621



J. PARSA
PRIMARY EXAMINER